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[54] **TEXTURE MAPPING AND OTHER USES OF SCALAR FIELDS ON SUBDIVISION SURFACES IN COMPUTER GRAPHICS AND ANIMATION**

[75] **Inventors:** **Anthony David DeRose**, San Rafael; **Michael Kass**; **Tien Gia Truong**, both of Berkeley, all of Calif.

[73] **Assignee:** **Pixar Animation Studios**, Richmond, Calif.

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[52] **U.S. Cl.** **345/430**

[58] **Field of Search** **345/418, 419, 345/423, 424, 425, 428, 429, 430**

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Primary Examiner—Phu K. Nguyen

Assistant Examiner—Cliff N. Vo

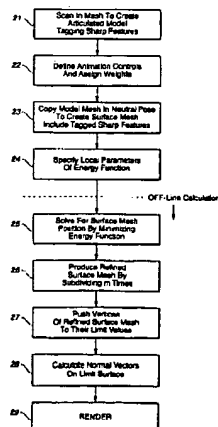
Attorney, Agent, or Firm—McCutchen, Doyle, Brown & Enersen, LLP

[57] **ABSTRACT**

Methods for defining smooth scalar fields on arbitrary polygonal meshes which can be consistently carried through the subdivision process involve computing mesh vertices after subdivision to a suitable resolution and computing scalar field values at the vertices corresponding to an arbitrary smooth surface, including the limit surface. The methods allow one to define and compute the value of scalar fields over an arbitrarily dense set of points on the limit surface. Applications of these techniques in computer graphics and computer animation include: (1) the definition of pseudo-coordinates for use in parametric shading including texture mapping; (2) the assignment of smoothly varying articulation weights over the control points of a model to more efficiently define the transformation of a highly detailed object or character under specific animation controls; and (3) the assignment of smoothly varying local parameters for specifying the local behavior of dynamic or quasi-static objects or surfaces.

7 Claims, 11 Drawing Sheets

(6 of 11 Drawing Sheet(s) Filed in Color)



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